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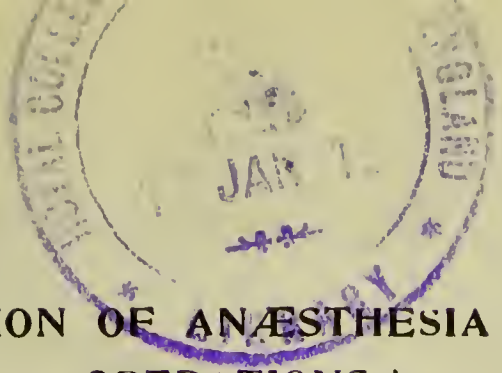
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THE QUESTION OF ANÆSTHESIA IN GOITRE
OPERATIONS.

BY WILLIAM SEAMAN BAINBRIDGE, M.D.,
OF NEW YORK.

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THE QUESTION OF ANÆSTHESIA IN GOITRE OPERATIONS.*

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INTRODUCTORY REMARKS.—The wonderful achievements which have marked the progress of surgery during the past few years finds an especially brilliant illustration in the domain of the operative treatment of goitre, from the radical or curative to the symptomatic or palliative procedures. On the basis of new discoveries along biological lines, or because of special refinements of technic, the surgery of the thyroid gland has reached a certain stage of perfection, with constantly improving results.

The question of anæsthesia in goitre operations, on the other hand, is still an unsettled problem, and is, therefore, in the foreground of surgical interest. The particular method of inducing insensibility to pain in these operations which is given the preference varies according to the personal experience or otherwise acquired opinion of the surgeon. The different procedures now in use have been employed with more or less success, but it would seem reasonable to assume that the most satisfactory results may be obtained by the method of anæsthesia or analgesia which is most nearly in keeping with the principles involved in the surgical treatment of goitre.

It is not my purpose in this contribution to do more than touch upon the technical side of thyroid surgery. I shall confine my brief consideration of the subject rather to such aspects as are directly concerned with the selection of the anæsthetic or the method of administration.

SURGICAL CONSIDERATIONS WHICH INFLUENCE THE SELECTION OF THE ANÆSTHETIC AGENT OR METHOD OF ADMINISTRATION.—Certain surgical problems, always to be reckoned with, are particularly important in the surgery of the thyroid gland, not only because of the location of the operative field, but because of the psychical aspects which

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may be involved. These problems, which need only be mentioned here, are influenced more or less directly by the anæsthetic, and it is therefore of the utmost importance that they be given due consideration. Chief among them are the following: (1) The maintenance of normal blood-pressure; (2) the determination of the amount of dyspnœa; (3) the avoidance of injury to the recurrent laryngeal nerve, or other nerves in the vicinity; (4) the control of hemorrhage; (5) the lessening of post-operative shock; (6) the lessening of psychic shock.

SELECTION OF ANÆSTHETIC AND METHOD OF ADMINISTRATION.—The following general procedures enter into consideration in the selection of an anæsthetic agent or a method of administration for any operative procedure upon the thyroid gland: (1) General anæsthesia; (2) anoci association; (3) local anæsthesia; rectal anæsthesia (ether in oil).¹

General Anæsthesia.—It is interesting to note that those whose practical work has been the most extensive are also those who are most strongly inclined toward methods of anæsthesia other than general narcosis. Kocher, with his enviable record of over 5,000 goitre operations, is unconditionally opposed to general anæsthesia in these cases. The disadvantages of general anæsthesia, according to Kocher, consist in the following:

(1) The danger of too much lowering of the blood-pressure when the heart action is weak. The falling of the blood-pressure below 120, as compared with the average of 150 mm. Hg., measured with the Riva-Rocci apparatus, endangers the outcome of the radical operation. Measuring the blood-pressure is one of the necessary preliminaries to any method of general anæsthesia in goitre operations.

(2) The difficulty of ascertaining the degree of dyspnœa.

¹Since the preparation of this paper, Dr. James Tayloe Gwathmey, in a series of 50 general surgical cases, has employed a mixture of ether in oil, administered by rectum. The anæsthesia thus induced, according to this authority, has been almost ideal, simulating normal sleep. If further experience bears out these results, the method gives promise of being one of the best, if not the very best, for goitre cases. The writer is testing the method in a series of neck cases.

(3) The increased risk of accidental injury to the recurrent laryngeal nerve.

(4) The lessened surety of a perfectly aseptic course, for the dressings, and with them the wound itself, are more apt to become contaminated by vomited matter.

Another very serious objection against general anæsthesia in goitre operations is the patient's liability to a severe attack of asphyxia, in consequence of excitement at the beginning of the narcosis, more particularly in cases with stenosis of the trachea or paralytic symptoms on the part of the laryngeal nerves.

The condition of the heart and lungs undoubtedly adds to the risk of general narcosis in a considerable number of goitre cases. Grave risk is involved in aged goitre subjects, with much enlarged thyroids, softening of the trachea, chronic bronchitis, and irregular weakened heart action. General narcosis has also been held responsible for fatal syncope at the beginning of the operation, more or less sudden cardiovascular symptoms, bronchial disturbances, and pulmonary complications. The vomiting and retching after chloroform or ether anæsthesia are extremely distressing and painful, and may induce very troublesome complications, such as severe secondary hemorrhage. The administration of chloroform is sometimes followed by albuminuria, and its toxic action is apparently increased through degeneration of the thyroid gland. Post-operative complications of a toxic character after the employment of general anæsthesia are also referred to by Kocher, who attributes the very low mortality in his last series of one thousand goitre operations to the omission of the general anæsthetic.

Goitre operations under general narcosis expose the patient to the danger of nerve-contusion through ligatures or clamps, followed by spasm of the glottis, with secondary paralysis. It should also be emphasized that a paresis which has existed prior to the surgical interference may become aggravated into a total and persistent paralysis through traction incident to the operation under general anæsthesia.

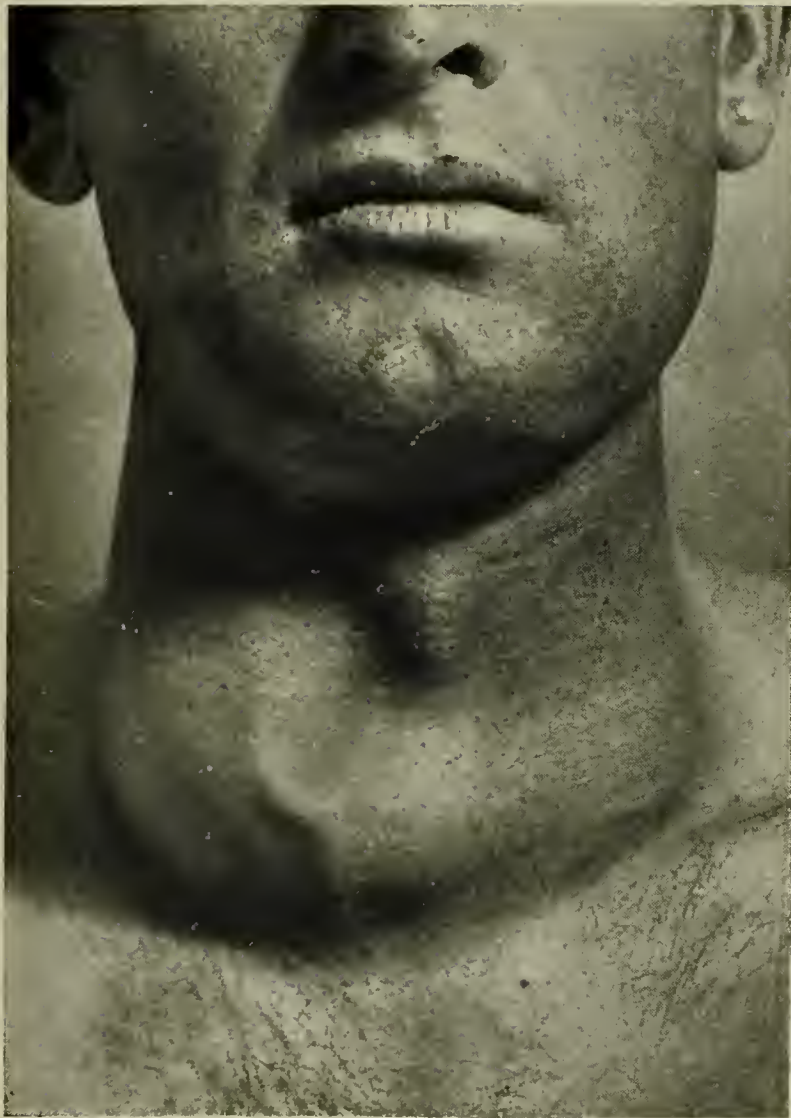
The number of surgeons who persist in the belief that

there is a tendency to exaggerate the dangers of general narcosis in goitre operations will undoubtedly diminish on the basis of increasing practical evidence. It is certainly suggestive that authorities such as Kocher, Rehn, Socin, Jaboulay, and others, unconditionally oppose general narcosis in these cases. Their operative records bear eloquent testimony to the soundness of their views.

If, for any reason, general anæsthesia must be employed, the essence of orange-ether proposed by Gwathmey, or any other vapor anæsthesia, is the most satisfactory. Vapor anæsthesia, with the apparatus first proposed by Gwathmey, in 1910, provides for the giving of a smaller amount of the anæsthetic than is required with any other method. Excitement is usually absent or inconsiderable, and unpleasant after-effects are altogether absent in ninety per cent. of the cases. All patients can be narcotized within five minutes, and a satisfactory continued narcosis is always maintained. The addition of one to three drops of the oil of orange, or three to five drops of the essence of orange (25 per cent. oil of orange and 75 per cent. deodorized alcohol) serves to disguise the odor of the anæsthetic very efficiently, in this way diminishing the undesirable side effects incident to the inhalation of the gas, and approaching this method to the principle of Crile's anoci association.

Anoci Association. The *anoci association* of Crile introduces new features into the aspect of anæsthesia, by taking into consideration the psychic side of the patient. The method consists in the injection of local anæsthetics into the field of operation, in addition to the other preparations, prior to the giving of the general anæsthetic. The procedure is based upon the observation that the psychic excitement of the goitre bearer is one of the greatest obstacles in the way of operative success. Observation of Crile's work is most interesting and cannot fail to impress the spectator with the desirability of utilizing the elements of anoci association in the operations under consideration. Crile claimed and showed that the general anæsthesia, more particularly with ether, fails to protect the brain cells against exhaustion from the operative traumatism. The shock incident to

FIG 1.



Exophthalmic goitre. Before operation.

FIG. 2.



Thyroidectomy. Injecting local anesthetic, novocaine, 1 per cent. in skin; $\frac{1}{4}$ per cent. in deeper structures.



Thyroidectomy under local anesthesia. Goitre exposed and tumor dislocated from behind sternum and brought up into wound.

FIG. 4.



Thyroidectomy under local anesthesia. Goitre-holding forceps in place.

FIG. 5.



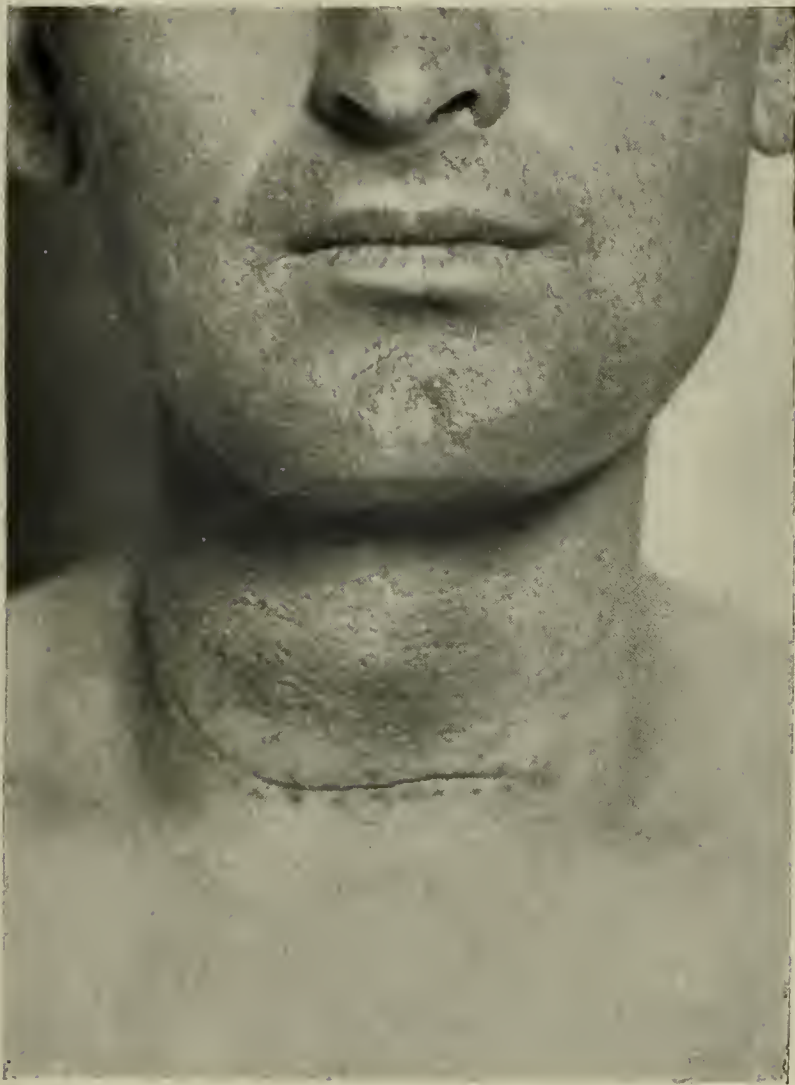
Thyroidectomy under local anesthesia. Stopping oozing with hot applications to the raw surfaces after extirpation of tumor.

FIG. 6.



Thyroidectomy under local anæsthesia. Deeper structures sutured. Skin ready for closing.

FIG. 7.



Thyroidectomy. Twenty days after operation.



fear, the shrinking of the mind no less than the flesh, and the subconscious response to pain before and during the operation, which otherwise induce a discharge of vital energy, are avoidable by the application of local anæsthesia, which bars the way of the harmful associations through the intervening nerve trunks to the brain. In connection with a local anæsthetic, the anoci method of Crile acts most beneficially through its merciful withholding, for the time being, of the messages of distress that are constantly being conveyed to the helpless brain by the nerves. "The psychic factor," according to Crile, "which is the most important in the surgical risk, may be eliminated by 'stealing' the gland. When eliminated, the operative risk seems to be greatly reduced."

Local Anæsthesia.—The advantages of local anæsthesia in goitre operations were first emphasized by Socin, and his recommendations were endorsed by Bier, Madelung, and other operators of renown. Kocher, who is an earnest advocate of local anæsthesia, is fortified in his position by an experience in a series of 5,000 goitre operations. Among 603 uncomplicated, but in part very difficult goitres, in his last series of 1,000 cases, no patient died. The same applies to 19 operations on recurrent goitres, which are apt to prove especially troublesome to the operator, on account of cicatrices and adhesions. Of 26 incisions for malignant struma, all recovered. Definite end results could be traced in only 320 of Kocher's operative cases, with a complete cure in 150 patients, while 148 are considerably improved although still showing individual symptoms of the disease. The results were unsatisfactory in only 22 cases, either because the operation could not be completed, or because recurrences followed (in five per cent.), or on account of secondary disturbances of thyroid origin failing to subside after operation.

The possible advantages of local anæsthesia, in my experience, are the following:

- (1) The hemorrhage is considerably diminished.
- (2) A free survey of the field of operation is provided, and movements of the throat at critical steps may be prevented by instructing the patient to hold his breath.

(3) The inferior laryngeal nerve is absolutely protected, by the possibility of phonation in the conscious patient. This is doubly important in view of the fact that clamping or ligatures in the immediate vicinity of the nerve may mean a persistent hacking cough as a sequel to the operation.

(4) Requiring a better control of the technic on the part of the operator, local anæsthesia safeguards the patient against all unnecessary brutalization of the tissues.

(5) The strain on the kidneys is lessened, as they are not called upon to eliminate the general anæsthetic, and may be flushed through the stomach, by the administration of abundant fluid, when the need is greatest, immediately after the operation.

(6) Avoidance of post-operative vomiting, and thereby diminution of the risk of secondary hemorrhage.

(7) Less elaborate technic, as local anæsthesia does not involve the same refinement of detail as general narcosis.

(8) The risk of operative shock is partly eliminated, as patients are apt to consider the operation less serious under local than under general anæsthesia. The importance of this is illustrated by the occurrence of death in patients while being prepared for general anæsthesia, the fear of the operation being intensified by the thought of "going to sleep."

(9) Elimination of the dangers of all general anæsthetics.

In a recent paper on the surgery of the thyroid gland (1913), Berry emphasizes that much depends upon the anæsthetic and much upon the patient. In the opinion of this operator, the method which is the most suitable of all, for the severe type of case, is local anæsthesia, provided that the patient is willing to submit to operation under these conditions. The fact that the patient can drink freely during and immediately after the operation, is regarded by him as the main advantage of local analgesia, diminishing as it does the tendency to excessive post-operative tachycardia, which is one of the principal dangers after surgical manipulation upon goitres.

In discussing the goitre operations of the five years between 1905 and 1910, in the Surgical Clinics of the Ber-

lin Charity Hospital, Walz accords the preference to local anæsthesia. There was only one death among 120 benign goitre cases. In the experience of Enderlen, local anæsthesia failed in only a single instance, in the case of a child, among 166 goitre operations, during 1909. In the Clinics of Rehn, in Frankfort-on-the-Main, the preference is accorded to local anæsthesia in these cases. In reporting 510 and 452 goitre operations, respectively, from the Innsbruck Surgical Clinics, 1909-1910, Schloffer states that local anæsthesia with different agents proved very satisfactory. Fairlie Clark, in England, had very favorable results with local anæsthesia in goitre operations, such as excision of one-half of the gland or ligature of both superior thyroid arteries.

As a pupil of Kocher I have been interested in local anæsthesia in goitre surgery, and added experience has steadily strengthened my convictions concerning the expediency of this method.

Manipulations on the goitre are said to be but slightly painful in themselves, the actually painful steps of the operation being limited to the incision of the skin, and the displacement, or so-called luxation, of the goitre. It is undoubtedly possible to operate painlessly, or very nearly so, in a large number of cases, by means of local anæsthesia. The skin incision is thus rendered absolutely painless, and in the further course of the operation, the patient is troubled not so much by pain, as by a sensation of tightness and pressure, during the delivery of the goitre. Serious and protracted goitre operations have been performed under Schleich's infiltration anæsthesia, without causing special pain to the patient.

The employment of local anæsthesia may place a greater strain upon the operator, whose work may be hindered by the defensive movements of the patient, on account of the pain due to traction upon the nerves or the application of ligatures to blood-vessels. It is here that combination of the related methods of local anæsthesia and anoci association will exert a beneficial effect, by diminishing the nerve strain and shock of patients both during and before operation.

The same purpose is served by proper preliminary medication, and by the personal contact of surgeon with patient, confidence which results in a state of nerve-calm.

The possible disadvantages of local anæsthesia, in a small number of cases, consist in the added difficulty and length of the surgical procedure, the increased demands upon the operator's skill and self-possession, and the intractability or hysterical condition of certain patients. Other objections, such as an unfavorable influence of the local injection upon the repair process, are not tenable.

Goitre must be regarded as a surgical disease, and operative intervention naturally calls for the control of pain. The physician who has the comfort and safety of his patients at heart will give them the utmost benefit of what is, perhaps, the greatest blessing modern chemistry has bestowed, namely, the arbitrary arrest of pain in the field of operation, by means of local anæsthesia.

Any of the local analgesic agents may be employed—stovaine, cocaine, novocaine, etc. In the case illustrated herewith, novocaine was employed, 1 per cent. in skin, and $\frac{1}{4}$ per cent. in the deeper structure. The case was one of exophthalmic goitre, with large vascular thyroid, and with marked heart and eye symptoms. Preliminary medication of $\frac{1}{4}$ of morphine, and $\frac{1}{150}$ of atropin, is given half an hour before operation.

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